PRINTER OF A NEW TYPE

The present invention relates to a printer for printing, preferably by thermal transfer, of articles such as cards, in particular of plastic material.

It relates more particularly to a printer of the type comprising, from upstream to downstream, a loader for articles to be printed, adapted to coact with a motor element for articles leaving the loader, a printing device and transfer means to conduct sequentially the articles from the loader outlet to the printing device and from the printing device to means to collect the printed articles.

Such printers are well known to those skilled in the art. Until now, the ejection of a card contained in the loader in the direction of the printer takes place as follows. The loader is constituted by a casing connected to one of the surfaces of the frame of the printer. This casing comprises, in its rear wall, an opening. The stacked cards within the loader are maintained in bearing relation against the bottom of the casing by a weight. A cylinder projects partially through the opening and comes to bear against said cards. This cylinder is driven in rotation by a motor to give rise, by friction, to the movement of a card out of the casing of the loader. This motor is stopped upon the card leaving,

which is then driven in movement within the printer by transport rollers driven in rotation by means of a second motor. A printing device, disposed within the printer, is itself controlled in operation by means of a third motor. The design of the printer thus requires arranging on the one hand a motor dedicated solely to the operation of the expulsion cylinder for the cards from the loader, and on the other hand a motor dedicated to the operation of the transport rollers.

An object of the present invention is to provide a printer of the type mentioned above whose design permits omitting one motor in comparison to the conventional printers known until now, without impeding the operation of the printer.

To this end, the invention has for its object a printer for printing, preferably by thermal transfer, of articles such as cards, in particular of plastic material, of the type comprising, from upstream to downstream, a loader of articles to be printed, adapted to coact with a motor element for the outlet of articles from the loader, a printing device and a transfer means to lead articles sequentially from the outlet of the loader to the printing device and from the printing device to means to collect the printed articles, characterized in that the motor element for articles leaving the loader, constituted by a cylinder in contact with the articles to be printed by means of an opening provided in a wall of the loader, is moved by a motor common to the transfer means, a contact between the loading cylinder and the articles

to be printed being sequentially interrupted by an isolating device displaced by a mechanical connection with the motor of the printing device.

Thanks to the presence of the isolating device between the rotating cylinder of the loader and the article contained in the loader, the cylinder of the loader can be driven in rotation, including during a printing cycle, without causing the outlet of a fresh card from the loader.

The invention will be better understood from a reading of the following description of embodiments, with reference to the accompanying drawings, in which:

Figure 1 is a schematic view of a printer according to the invention;

Figure 2 is a schematic perspective view of the mechanical connection between the printing device and the isolating device in so-called initial position;

Figure 3 is a schematic view of the connection between the printing device and the isolating device in a so-called article loading position;

Figure 4 is a schematic perspective view of the connection between the printing device and the isolating device in a printing position of an article, and

Figure 5 is a schematic perspective view of the insulating device and of the loading cylinder in an exploded position of the elements.

The printer which is the object of the invention is more particularly adapted for printing, preferably by thermal

transfer, of articles 20 such as cards, in particular of plastic material.

This printer comprises, in a known manner, from upstream to downstream, a loader 1 for articles 20 to be printed adapted to coact with a motor element for removing the articles 20 from the loader 1, a printing device 2 and transfer means 3 to conduct sequentially the articles 20 from the outlet of the loader 1 to the printing device 2 and from the printing device 2 to the collection means for the printed articles. These collection means (not shown) can be constituted particularly by a collection bin disposed on the introduction side of the card into the printer or on the opposite side of the printer. A cleaning device 21 can also be interposed between the printing device 2 and the outlet 18 of the loader. This cleaning device 21 can be constituted by at least one cleaning roller disposed parallel to and below a rotating roller 3 constituting one of the elements of the transfer means. The card 20 to be printed comes from the outlet of the loader to be disposed between said rollers delimiting a pinching region and is driven by means of the rotating roller 3 coacting with the cleaning roller in the direction of the printing device 2. In the course of this passage between said rollers, dirt covering the card 20 is eliminated by an appearance of the dirt to the cleaning roller. The card proceeds to move along the transport path delimited by the transfer means 3 to come to the printing device 2. In the example shown in Figure 1, the card 20 is

moved by transfer means 3 beyond the printing device 2 and then is returned below the head 2B of the printing device there to be printed before being extracted from the body of the printer by the transfer means 3.

In this printer, the loader 1 is constituted by a casing generally fixed removably on one of the surfaces of the body of the frame of the printer. This casing comprises an opening 5 provided in one of its walls, in this instance the bottom wall of the loader 1. The cards 20 to be printed are maintained within the loader 1 bearing against the wall having this opening 5. The exit of the cards 20 from the loader is achieved by means of a motor element constituted by a cylinder 4 rotating in contact with the cards 20 to be printed, through the opening 5. Driving in rotation of this cylinder 4 gives rise, by frictional contact with a card 20 held bearing against the wall of the loader 1, to the exit of this card through a slot 18 of the loader 1. This card 20 is then driven, by means of the transfer means 3 which will be described hereafter, to the interior of the printer to be printed.

In a manner characteristic of the invention, and as shown in the drawings, the cylinder 4, constituting the drive element for the cards 20 from the loader, is moved by a motor 6 common to the transfer means 3. In the illustrated examples, these transfer means 3 are constituted by pairs of cylinders or parallel rotating rollers disposed along the path of movement and of transport of the card 20 within the

printer. Each pair of rollers delimits a pinching region for the card 20 driven by friction upon driving in rotation one of the rollers of the pair, the other roller being adapted to be freely mounted in rotation. The connection between motor 6, transverse cylinders 3 and drive cylinder 5 for loading, can be obtained by means of an endless transmission such as a belt transmission.

To prevent continuous supply of the cards 20 contained in the loader in the direction of the printer, the contact between cylinder 4 of loader 1 and articles 20 to be printed is sequentially interrupted by an isolating device 7 which will be described in greater detail hereafter. This isolating device 7 is moved by a mechanical connection 8 with the motor 9 of the printing device 2.

In the illustrated examples, the loader 1 comprises means 10 returning, preferably resiliently, the articles 20 to be printed in the direction of the opening 5 of the loader 1 to bring them into bearing contact with the drive cylinder 4 of the loader 1. In the example shown in Figure 1, the return means 10 are constituted by a spring returning a pivoting flap 25 disposed within the loader 1 bearing against the top of the pile of cards 20. The isolating device 7 comprises itself means 11A, 11B bearing sequentially against said articles 20 to move them against the return means 10 to as to prevent any contact between articles 10 and drive cylinder 4 of the loader 1. Thus, the isolating device 7 tends, in the illustrated examples, to raise the cards 20 contained within the loader 1

when they occupy an active position corresponding to a position bearing against the drive cylinder 4.

In a particular manner, this isolating device 7 is formed by a cage 11 partially surrounding the drive cylinder 4 of the loader 1 by means of a discontinuous peripheral wall. In the illustrated examples, the discontinuous peripheral wall of the cage is shaped to delimit at least two bars 11A, 11B, at least one of said bars 11A, 11B being adapted, in a first active angular position of the cage, to isolate the articles 20 to be printed from the drive cylinder 4 of the loader 1 turning freely within the cage 11 and, in a second inactive angular position of the cage, to withdraw so as to permit, in the space between the bars 11A, 11B, a contact between article 20 and cylinder 4.

Each bar thus has the shape of a curved wall moving about a circle passing through the axis of rotation of the cylinder 4 of the loader. These bars 11A, 11B are so constructed as partially to enclose the cylinder 4 so as to provide in the space between the bars one or several openings through which the cylinder 4 can come into contact with the article 20, such as a card, stored within the loader 1. The cage 11 thus defined can occupy at least a first angular position, so-called active, in which at least a portion of the wall, such as a bar, in this case the bar 11A, isolates the articles to be printed from the freely turning drive cylinder 4 of the loader 1. This first position is more particularly shown in Figures 2 and 4. This cage 11 can also occupy at

least one second angular position, so-called inactive position, in which the wall or respectively the bars 11A, 11B are retracted to permit contact between the article and the cylinder 4, as shown in Figure 3. Clearly, each time, the angular movements of this cage 11 are controlled by a motor 9 common to the printing device 2.

The printing device 2 is itself constituted by at least one shaft 2A with cams 2C on which bears a printing head 2B driven with an up and down movement during angular movement of the shaft 2A to move between an upper inactive position and a lower active position, the angular movement of said shaft 2A being synchronized with the angular movement of the cage 11 so as to define at least two positions, one so-called loading position in which the printing head 2B and the cage 11 are in inactive position and a fresh article 20 is driven from the loader, the other, so-called printing position, in which printing head 2B and cage 11 are in the active position to avoid any drive of a fresh article during the printing sequence. The printing head 2B will not be described in greater detail because it is well known to those skilled in this art.

This printing head 2B is generally mounted within a support as shown in Figure 2.

The cage 11 and the shaft 2A with a cam can occupy at least a third position intermediate the first and second positions, in which the cage 11 is in an active position whilst the printing head 2B is in an inactive position. This

position is more particularly shown in Figure 2. The passage from one angular position to another of the isolation device on the one hand and of the shaft 2A with cams 2C of the printing device on the other hand, is obtained by means of a single motor 9. The isolation device 7 is connected to this motor 9 by a mechanical connection 8 constituted by a device of the crank type comprising a rotatable flywheel 13 connected to the motor 9 by a reducing mechanism 14, this flywheel 13 with an eccentric crank pin 15 receiving a rod 16 connected to the cage 11 by a crank arm 17 so as to give rise, during actuation of the motor 9, to an angular displacement of the cage 11. At least a portion of this reducing mechanism 14, disposed between the crank and the motor 9 of the printing device 2, is common to the drive mechanism 12 of the printing device 2. Thus, the shaft 2A with cams 2C of the printing device 2 is connected by a reducing mechanism 12 with pinions to the motor 9 controlling the operation of the isolating device 7.

The motor 9 of the printing device 2 is reversible in direction. There is thus obtained a succession of positions as follows. In a first instance, isolating device 7 and printing device 2 occupy an inactive position as shown in Figure 2. This position is called the initial position or intermediate position. In this initial position the bar 11A of the cage is disposed in a position in which it isolates the cards 20 contained in the loader 1 of the drive cylinder 4 adapted to be driven in rotation by a motor 6 common to the

transport rollers 3. The printing head 2B is itself maintained in an upper or inactive position by means of cams 4C on the camshaft 2A. When a card 20 is to be expelled from the loader, the motor 9, common to the isolating device 7 and to the printing device 2, is driven in rotation so as to drive the cage 11 of the isolating device 7 to the left from the position shown in Figure 2. The printing device and the isolating device then occupy a so-called loading position, shown in Figure 3. In this position, again, the printing device is in the inactive position, thanks to the positioning of the cams 2C on the camshaft 2A, whilst the bar 11A of the cage 7 has been moved to permit the cylinder 4 to come, because of the free space between bars 11A and 11B, into contact with the cards 20 disposed in the loader. This position thus corresponds to an outlet position for a card 20 from the loader 1 by bearing contact against cylinder 4 and the card is disposed against the bottom of the loader 1. Upon the exit of the card 20 from the loader 1, the printing device 2 and the isolating device 7 return to the position shown in Figure 2 by reversal of the direction of rotation of the motor. The card then pursues its path within the printer by means of the transport rollers 3 as shown in Figure 1, until it extends beyond the printing device 2. In this position, the transfer means 3 are stopped in rotation and the shaft 2A with cams 2C and the cage 11 are driven in a direction of rotation corresponding to a rotation toward the left of the cage 11 to bring the printing head 2B into the lower or active

position and to permit the isolating device 7 to maintain an isolation between cards 20 contained in the motor 1 and cylinder 4 by means of the bar 11B. In this printing position, the card is printed by coaction of the printing head 2B with an impression film 22 shown in Figure 1, in a manner known per se. This film 22 can then be wound on the rollers 23, the so-called printing rollers. These printing rollers 23 can be motor-driven independently in the case of a polychrome printing process or be driven in a manner coupled with the motor 9 of the printing device in the case of a monochrome arrangement. A motor 24 corresponding to a polychrome arrangement is shown in Figure 1.

Once printing is finished, the printing device 2 and the isolating device 7 are brought back to the initial position corresponding to Figure 2 and the printed card follows its path to the collection means (not shown) for the cards, this movement being obtained by means of the transport rollers 3.

Thanks to the presence of the isolating device 7 and the coupling of this isolating device 7 to the motor 9 controlling the printing device 2, it is possible to drive in rotation the drive cylinder 4 controlling the exit of the cards from the motor 1, including during the printing step, such that this rotatable cylinder 4 can be coupled to the transport rollers 3 and be controlled in operation by a single motor 6 acting in parallel on the transport rollers 3. There results a simplification of the obtained printing.

It is to be noted that, in the illustrated examples, that the isolating device 7 is mounted by snapping on to the shaft of the cylinder 4 of the loader 1. There results a rapidity and simplification of mounting. To this end, the end walls of the cage 11 adjoining the peripheral wall of the cage are shaped to provide bearings in which will be disposed the shaft carrying the rotatable drive cylinder 4 of the loader 1.